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THE BIRDS OF THE RED DEER RIVER, ALBERTA.

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Plates I-IV.

THE region about Red Deer and Calgary, Alta., has received the attention of several ornithological observers; but while individual notes and specimens from there are scattered through many publications and various collections no attempt has been made to correlate or bring them all together. During the summers of 1915 and 1916 the Geological Survey of Canada had parties collecting large fossils in the Edmonton and Belly River formations in the bad-lands of the Red Deer River. Incidental to this work Mr. George Sternberg of this museum collected a number of interesting birds. His account of the country and the ornithological specimens he secured, added to the fragmentary references in literature, proved so interesting that it was decided to make a more intensive ornithological investigation of the river during the summer of 1917.

June 18 found the writer and C. H. Young in Red Deer, where a rough scow-shaped boat was built, sixteen feet long and four and a half feet wide, capable of carrying ourselves and a comfortable amount of camp and collecting equipment. An outboard motor was attached and the descent of the river begun on June 25. While on the subject it may be well to state that this outfit was eminently

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satisfactory. The rather clumsy boat and low power motor while not adapted for navigating against the current were admirable for going with it, and had the trip to be made over again I know of no important detail that might be altered.

The river was at about mid-height. The high spring floods were past but the water had not reached its low summer level. No rapids of importance were encountered and in only two places was navigation more than mildly exciting. The first was the "Canyon," some twenty-five miles from Red Deer via the river, though only eight miles overland. The other was just above the Grand Trunk Pacific Railway crossing south of Alix between camps 3 and 4. We had heard from residents of the danger of these places and probably at certain stages of water they may be bad, but when we passed we found that the risk had been much exaggerated.

From Red Deer to Drumbeller the river was usually deep and water could always be found for much deeper draught than ours. Occasional shallows occurred and islands divided the current, necessitating some care in choosing the proper channel. It was necessary also to put such a motor as we had on a hinge to avoid disaster when through misjudgment the wrong channel was taken and shallow water was unexpectedly encountered. A little above Drumbeller and continuing below, the river widens and shallows and the bottom changes from boulder and gravel to sandy mud, forming shifting shoals between which the channel meanders confusingly, rendering navigation more complicated though mistakes were annoying rather than serious.

The whole valley of the river lies some 100 to 250 feet below the general prairie level. Above Nevis, Camp 4, it is comparatively narrow and bounded by simple hills, steep bluffs or rocky cliffs, usually as well covered with vegetation as the slope and age of exposure permits. The prairie begins close to the river at the verge of the first embankment and the ox-bow bends are well wooded. Below Nevis the aspect of the landscape changes considerably, bare, raw, freshly eroded exposures are the rule and bad-land conditions are assumed. The ox-bows are extensive gumbo flats with the woods confined to the river edge; otherwise bare bluffs rise straight from the water, or raw clay hills, striped horizontally with black coal seams, succeed each other as far as the eye

can reach, shaped by the elements into strange forms, gashed into gullies with sharp knife-edged buttresses between, or carved into domes and sugar loaf shapes. Between Camps 9 and 10 this sculpturing becomes more pronounced and stranger still. The domes are more conical, their sides steeper, vertical cliffs and sink-holes are more common and the sky line more ragged. Gothic cathedral outlines replace Byzantine domes and the landscape exhibits a confusion of buttressed spires and balanced rock-capped pinnacles.

The country about Red Deer is rolling prairie of varied and interesting aspect with considerable spruce bush covering the hills and following watercourses. On the river, as far as Nevis, spruce of considerable size is a conspicuous element in the vegetation, ascending the hills on either hand wherever root hold can be obtained, while the stream margin is well clothed with poplar, birch and willow. Below Nevis the spruce gets less common and smaller, and within a few miles further down exists only as small scrub covering the higher and colder slopes. Below Drunheller it ceases to exist at all. As the spruce gives out the cottonwood along the banks takes on a larger and stronger growth. Wherever the swing of the river has built up an alluvial plain the margins are well wooded for a hundred yards or so back from the water. Most of this is cottonwood and large trees with great rough trunks and spreading branches like grove-grown oaks occur commonly. The smaller shrubbery is largely saskatoon or willow and alder. This character of vegetation persists, except on the eroded banks, to near Steveville, Camp 10, below which the timber becomes smaller and scantier, and at our final Camp 11, even tent poles were difficult to find and sage brush and prickly pear cactus generally came down to the river banks.

The ecological conditions follow the physiographical aspects. About Red Deer and nearly to Nevis the river valley is mesophytic, while below drier conditions prevail, until at our last station, Camp 11, below Steveville, the raw bare landscape, scanty buffalo grass, sage brush and prickly pear cactus proclaimed the typical desert, except here and there on the narrow flood banks and in traces along the lower courses of occasional intermittent creeks.

The river valley as far as we followed it is practically unin-

habited. Here and there on the most promising of the wider bends little ranch establishments peep out of the wooded shores, but many of them in war time, alas, were closed and deserted, others seem to have been occupied only long enough to obtain legal homestead title, and only a few of them were occupied. Grazing is the principal industry in such places and most of the bush margin is traversed by cattle paths. However, though scarcely a soul was visible throughout most of the trip, we had only to climb to the prairie level to find some of the most fruitful and best cultivated lands in the Canadian west: so, though apparently traveling in the wilderness, we were really never far out of touch with settled communities. This was especially true and striking on the upper reaches and down as far as the Tolman Ferry, Camp 6, where we made our last excursion out of the valley. At the last camp, No. 11, when we finally left the river, the upper level conditions were rather different, and wide reaches of dry flat prairie dotted occasionally with bunches of cattle and horses and only suitable for cultivation by aid of the irrigation project of the Canadian Pacific Railroad met the eye from the river to the railroad at Millicent.

We left Red Deer June 25, arriving at Camp 11 near Steeveville, 217 miles below, July 19. This was the site of the Survey's palaeontological collecting camp under Mr. Chas. Sternberg and here C. H. Young remained until September 26, but the writer left for British Columbia July 21. During this trip, occupying about a month, no regular schedule was followed and we remained stationary or moved to the next location as local conditions suggested. The weather after the first day or two at Camp 1 was ideal for our work and we were even spared, by the seasonal conditions, serious trouble from mosquitoes that report had led us to expect to be bad. All who travel on the river do not escape so easily. Once or twice we camped too close to cattle herds and for our lack of foresight were vexed with flies. These were a more serious menace to our specimens than to us and our slow drying specimens of young raptors were seriously threatened by the pests. Careful screening of our drying trays however prevented further loss than the disfigurement of a few individual specimens.

Our first camp (No. 1) was made some twenty-seven miles below Red Deer, though only some 8-9 miles by road and just after we

passed the "Canyon." Here we remained until July 4, working the uplands as well as the valley, and obtained a fairly representative collection of the birds of the locality and an idea of the general conditions. Most species were breeding and all were very shy and retiring. We were further handicapped by being disinclined to take adults having families dependent upon them. This increased the work and limited practical results. From here on we made but short stops at varying distances and except at Camp 4, near Nevis, and at Camp 6, Tolman's Ferry, confined our attentions to the river valley itself.

At Camp 11, after the writer left, Young made a general survey of the locality, worked thoroughly all the surrounding territory within walking distance and made as complete a collection as possible. As he remained until the fall migrations were well under way he added many species to our list. His material is of exceptional interest as can be seen in the following annotations.

I have included in the list references to the collections made by Mr. Geo. Sternberg in 1915 and 1916 as well as some specimens collected by Mr. Chas. Horsbrough at Alix, in the vicinity of the upper river, besides occasional other notes from the same general locality. Those accredited to G. F. Dippie are cited, unless otherwise stated, from the 'Catalogue of Canadian Birds,' J. and J. M. Macoun, 1909. A good many specimens from this neighborhood are extant in various collections and should any reader of 'The Auk' have additional material or information I should be pleased to have it published as addenda to this list.

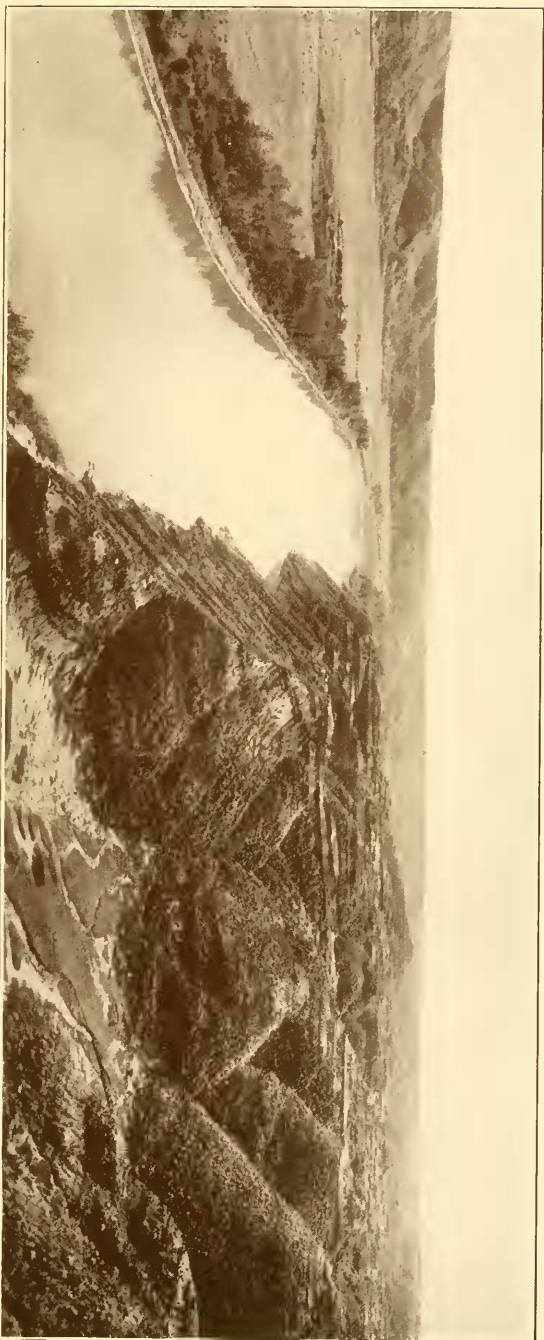
Since writing the above, a paper entitled 'Further Notes on the Birds Observed at Alix, Buffalo Lake and Red Deer, Alta., in 1915 and 1916' by Chas. B. Horsbrough, has appeared in 'The Ibis' for July 1918, pp. 417-496, giving annotations on ninety-five species and calling attention to a previous paper by the same author, 'Ornithological Notes from Alix and Buffalo Lake Districts, Alta., in 1914,' *Ibid.*, October, 1915, pp. 670-689, annotating eighty species. From these two lists much additional data has been extracted and a number of species added to our list. Mr. Horsbrough's rather free use of subspecific designations is a little disconcerting. In a few cases he has given his authority for his decisions but the majority are evidently made on geographical assumptions and hence whilst

most of his specific determinations can be confidently received I have not allowed his finer divisions to influence me. In this I am not wishing to criticise the writer personally, only the current system which he follows. As I may myself be called to task for sins of subspecific determination I wish to state that my decisions are based entirely upon the material in view and it is not the intention to cast reflections upon the conclusions of others or those based upon different material. I also wish to be judged by the letter of my statements and not upon inferences that may be read into them. Many of my conclusions are contrary to accepted authority, but in explanation I herewith quote from one whose authority can not be questioned and whose words though written in support of a somewhat opposite standpoint interpret my attitude much better than I can express it myself. The bracketed interpolations are mine,—“No doubt many of the forms which the author has [or has not] recognized as subspecies in the present work may [or may not] appear trivial [or important] to others, especially those who have not had the advantage of the material upon which they are based; but in all cases it has been the author's desire to express exactly the facts as they appear to him in the light of the evidence examined, without any regard whatever to preconceived ideas, either his own or others', and without consideration of the inconvenience which may result to those who are inclined to resent innovations, forgetful of the fact that knowledge can not be complete until all is known.”¹

The following is a schedule of the Camps which are referred to in the annotations. The fractional camp numbers in the text refer to occurrences en route between camps. Mileage is by the river as the boat traveled.

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|------|-----|-------|--|
| Camp | 1.— | 25 | Miles below Red Deer, June 25–July 4. |
| Camp | 2.— | 30 | Miles below Red Deer, July 4–5. |
| Camp | 3.— | 37.65 | Miles below Red Deer, July 5–6. |
| Camp | 4.— | 55.80 | Miles below Red Deer, the Pump-house near Nevis, July 6–9. |
| Camp | 5.— | 83.40 | Miles below Red Deer, Ross's Ranch, July 9–11. |

¹ Robert Ridgway, *Birds of North and Middle America*, Vol. I, 1901, pp. x-xi.



RED DEER RIVER BELOW NEVIS, ALBERTA.
Erosion on right, Alluvial Flats on left.

- Camp 6.— 97.20 Miles below Red Deer, Tolman's Ferry, July 11–13.
- Camp 7.— 132.00 Miles below Red Deer, Drumheller, July 13–14.
- Camp 8.— 139.50 Miles below Red Deer, near Rosedale Mines, July 14–17.
- Camp 9.— 163.20 Miles below Red Deer, 31–20 below Drumheller, July 17–18.
- Camp 10.— 213.60 Miles below Red Deer, 1 mile above Steveston, July 18–19.
- Camp 11.— 217.50 Miles below Red Deer, 3 miles below Steveston, July 19–September 26.

1.* ***Æchmophorus occidentalis***. WESTERN GREBE.— Two birds collected by Horsbrough, Buffalo Lake, near Alix Alta, June 1914, where he reports them breeding commonly. One of these, a female, is the form with slender recurved bill, once called Clarke's Grebe, *Æ. clarki*.

2.* ***Colymbus holbøelli***. HOLBELL'S GREBE.— Three seen on Brock's Lake at Camp 1: a female taken contained an egg ready to lay. Seen also on small pond near Bullocksville with young and on small waters in vicinity of Nevis. Though lakes apparently admirably adapted to them were examined on the upper levels at Tolman Ferry, no birds were noted upon them. Horsbrough reports them rare on Buffalo Lake but common on many smaller waters.

3.* ***Colymbus auritus***. HORNED GREBE.— A pair with nest containing a partially hatched brood was found on a small slough near Camp 1 and all collected. Only two seen thereafter at Camp 11 after the writer left, one juvenile being taken in extremely emaciated condition. This can probably be explained by the extremely muddy condition of the water preventing the bird from seeing its prey.

4.* ***Colymbus nigricollis***. EARED GREBE.— We saw no Eared Grebe ourselves but we have a specimen taken by Charles Horsbrough at Buffalo Lake, near Alix, June 11, 1914. He mentions the species in neither of his lists.

5. ***Podilymbus podiceps***. PIED-BILLED GREBE.— Horsbrough reports a pair breeding on a small pond near Alix and commonly on Buffalo Lake in 1914.

6. ***Gavia immer***. COMMON LOON.— Reported as being occasionally seen on Brock's Lake, Camp 1, on whose shores we found the decomposed remains of a single specimen. Horsbrough does not regard it as common.

7.* ***Larus delawarensis***. RING-BILLED GULL.— After July 8 at

* The asterisk denotes that specimens were taken or are in the collection of the Museum of the Geological Survey of Canada.

Camp 4 we saw occasional large gulls of the Ring-bill type but it was not until the 12th on a small lake near Tolman's Ferry that a specimen was secured and identified. It is an adult non-breeding male. The bill was yellow with dark spots on the mandibles not forming a complete ring. The inside of mouth was orange shading to bright red in throat and showing externally at the gape. Eye-ring vermilion. The legs and feet are clear chrome yellow instead of the greenish yellow that most of the written descriptions call for. It is not impossible that these prairie birds will be found to be distinguishable from the eastern race on the basis of leg coloration. Colored drawings of the soft parts were from the fresh specimen.

8.* **Larus franklini.** FRANKLIN'S GULL.—Seen almost daily in singles to occasional fairly large flocks as far as Camp 8½ July 17, after which they were observed less regularly. We found none breeding though we have downy young taken by Horsbrough at Mirror Lake, where he found large numbers of them in 1915. At Camp 11, July 27, Young collected a juvenile in an emaciated and starving condition, the only one seen there. From the remains found in the Duck Hawk nests we examined it was evident that Franklin's Gull is a favorable prey of that bird.

9. **Larus** sp. LARGE GULL.—Horsbrough received a report of Herring Gulls, *L. argentatus*, that formerly bred on Buffalo Lake, but does not personally substantiate it further than by recording the presence of a pair there June 2, 1914. These records may refer to the California Gull, *L. californicus*, or even *L. delawarensis*.

10. **Sterna** sp. TERN.—At the Pump House Camp 4 near Nevis, July 8, terns were seen but not taken and their identity, whether Common or Forster's, is problematical. Horsbrough records the Common Tern as breeding near Alix but does not mention Forster's.

11.* **Hydrochelidon nigra.** BLACK TERN.—A few seen about small lakes at Camp 1 and again at Tolman's Ferry. We have downy young taken by Horsbrough at Alix, 1915. He found them breeding commonly at Buffalo Lake.

12. **Phalacrocorax auritus.** DOUBLE-CRESTED CORMORANT.—Reported by Dippie at Buffalo Lake (1896?). Horsbrough mentions a bird, provisionally referred to this species, seen there May 20, 1915, and repeats reports of its breeding near Edmonton.

13. **Pelecanus erythrorhynchos.** WHITE PELICAN.—Though we saw no Pelicans we heard of them from several sources and Charles Sternberg reported seeing one at his camp on the Little Sandhill Creek, June 24.

14. **Mergus** sp. MERGANSER.—One was seen between Tolman's Ferry and Drumbeller July 13. It was a female or juvenile and its species could not be determined.

15.* **Anas platyrhynchos.** MALLARD.—Quite common breeder on sloughs and ponds of the upper prairie level but less often seen on the river itself. Local residents near Red Deer speak with disdain of the locally

raised "green heads" saying that the migrants that come in the fall are a much finer race of birds and easily recognizable by their superior size.

16.* *Chaulelasmus streperus*. GADWALL.— An adult and brood of newly hatched young seen and four of the latter collected between Camps 4 and 5, July 9. Dippie found it common on Buffalo Lake in 1896 and Horsbrough reports nests in 1914.

17.* *Mareca americana*. BALDPATE.— At least two pairs observed on Brock's Lake near Camp 1, and a male collected, June 28. Horsbrough noted it near Alix and records nests at Buffalo Lake.

18.* *Nettion carolinense*. GREEN-WINGED TEAL.— Common and with young on some of the smallest sloughs on the prairie level but not often seen on the river itself. The only specimens obtained were flying juveniles at Camp 11, August 15 and 23 where Young reported them as not common.

19.* *Querquedula discors*. BLUE-WINGED TEAL.— Common on the lakes and sloughs on the prairie level but not seen often in the river valley. Specimens taken at Camps 1 and 11 August 24.

20.* *Spatula clypeata*. SHOVELLER.— Only seen at Camp 11 on the Little Sandhill Creek, August 17 and 18 when specimens were taken.

21.* *Dafila acuta*. PINTAIL.— This species did not seem to be very common. A female was seen swimming in the river between Tolman Ferry and Drumheller and acted as if it had young nearby. Young saw one large flock near the Little Sandhill Creek and took specimens of juvenile birds August 3 and 4. We have another specimen taken by Horsbrough at Buffalo Lake, May 1915, who records nests at Buffalo Lake and vicinity.

22.* *Marila marila*. GREATER SCAUP.— Though we did not specifically identify Greater Scaups we have one taken by Horsbrough, October 1915, at Alix, who reports nests at Buffalo Lake.

23.* *Marila affinis*. LESSER SCAUP.— Numbers of Scaups were seen on the ponds on the prairie level near Camp 1 and near Nevis. Most seen were males. The few females seen acted as if they had nests nearby but none were found. Our only specimen was taken at Camp 1 and is of this species. The Lesser Scaup is not mentioned by Horsbrough.

24.* *Marila valisineria*. CANVAS-BACK.— Two downy young in our collections taken by Horsbrough June 1914 at Buffalo Lake, who records several nests.

25.* *Clangula clangula*. AMERICAN GOLDEN-EYE.— The commonest duck on the upper river but not seen below Tolman's Ferry. The absence of the Golden-eye on the lower river is probably due to the lack of large timber supplying nesting holes. Most of the birds seen were females and it seems probable that the sexes separate before reproductive duties are finished. We surmise that the males might be found in numbers on the larger lakes in the vicinity. None were seen closely enough to detect Barrow's Golden-eye, though they were looked for carefully, and Horsbrough does not mention it. Our only adult specimen is a female and an undoubted American Golden-eye. Several broods of young were met with on the

river and on Brock's Lake near Camp 1. Near the latter place we were shown a hollow tree where the species was said to have nested. At Camp 4 near Nevis is a pump house supplying water to the railroad some several miles away. The engineer in charge told us that ducks frequently entered the attic of his dwelling quarters through an open stovepipe hole and made considerable scratching noise overhead. I climbed up into the space through a man-hole but saw no indication of a nest. Without doubt these must have been Golden-eyes that were attracted to the place but did not find it satisfactory. Our specimens include representatives of two downy broods and one adult taken on Brock's Lake, Camp 1, June 28 and downy young above Nevis, July 6.

26.* **Charitonetta albeola.** BUFFLEHEAD.—Two females with small broods were seen on Brock's Lake near Camp 1 and afterwards occasionally as far as Ross's Ranch, July 9. Young saw two at Camp 11, Little Sandhill Creek, September 14. Our specimens consist of downy young, Camp 1, June 28. Also adults and downy young from Buffalo Lake, taken by Horsbrough, June 21 and May and September 1914, who records several nests.

27.* **Oidemia deglandi.** WHITE-WINGED SCOTER.—White-winged Scoters were common on the river as far down as Camp 5. There were quite a number on Brock's Lake near Camp 1 and singles and small flocks and pairs were encountered here and there flying up or down the river. Both sexes were present in about equal numbers and a female taken on Brock's Lake July 2 contained an egg nearly ready for deposition. The residents, however, do not know of their nesting in the neighborhood and were as curious as to where they nested as we were. We have another specimen from Buffalo Lake, June 1915, taken by Horsbrough, who says they nest late in the season.

28. **Erismatura jamaicensis.** RUDDY DUCK.—Dippie reports finding eggs at Buffalo Lake, June 14, 1896, and Horsbrough also records a nest there.

29. **Chen hyperboreus.** SNOW GOOSE.—We heard of white geese being occasionally seen on the river but did not meet with any. Chas. Sternberg reports seeing one near the Little Sandhill Creek, June 2. This must have been a belated straggler. Horsbrough records both Greater and Lesser Snow Geese from Red Deer and Buffalo Lake respectively. He gives the length of the former as 27 inches but no further corroboration. He is probably mistaken in his diagnosis.

30.* **Chen rossi.** ROSS GOOSE.—Two specimens in our collections taken by Horsbrough, Buffalo Lake, September 26 and October 10, 1914. He does not mention the species in his lists.

31.* **Anser albifrons.** WHITE-FRONTED GOOSE.—We have a specimen in the museum collection taken by Dippie on the Red Deer River, Sept. 12, 1896. Horsbrough reports a specimen in October 1915.

32.* **Branta canadensis.** CANADA GOOSE.—A Mr. Krieger, upon whose land we camped at Camp 1, told us that geese used to nest on the



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1. CAMP 1, NEAR RED DEER, ALBERTA.
2. NESTS OF CLIFF SWALLOWS AND PRAIRIE FALCON NEAR LITTLE SANDHILL CREEK, ALBERTA.

clay banks in the immediate vicinity but have not done so for a number of years past. He further remarked that they are usually seen migrating high overhead and seldom come down into the river. Another Geological Survey party whom we met making a similar trip to ours under Dr. J. A. Allen of Edmonton, met two broods below Ross's Ranch. Between Camps 7 and 8 and 8 and 9 we met with nearly full grown families. When first seen they made for the shore along which they ran, trying to hide in the scanty bushes or in rock crevices. When routed out of these places or when they failed to find satisfactory concealment, they again took to the water and as none, not even the adults, could fly, they swam vigorously ahead of us, diving when we came too close. The female adult of one of these broods swam on ahead of us for several miles until the river widened enough to enable her to pass. The last seen of her she was paddling vigorously against the current endeavoring to rejoin her lost family, which were, by the way, sufficiently developed to be in little need of her care. Two specimens were taken, a nearly grown gosling and an adult female, July 17 and 18.

33. **Olor columbianus** (?). SWAN.—Both Mr. Krieger and Mr. Brock at Camp 1 informed us that swans were occasionally seen passing over but know of none being taken. Horsbrough repeats reports of occasional flocks near Alix and Haunted Lakes in April.

34.* **Botaurus lentiginosus**. AMERICAN BITTERN.—Mr. Brock near Camp 1, gave us a clear description of the Bittern in his neighborhood but it did not seem to be as common as would be expected amongst the numerous sloughs on the uplands and we did not note it until Young took a specimen August 22 at Camp 11 on the Little Sandhill Creek in the heart of the desert-like country. Horsbrough records nests at Buffalo Lake.

35. **Ardea herodias**. GREAT BLUE HERON.—Between Camps 3 and 4 and 9 and 10 single individuals were seen and followed from bend to bend for several miles before they circled back over the low bends and were lost. Young reports individuals in the vicinity of Camp 11, Little Sandhill Creek, August 14 and September 3. Horsbrough records only occasional birds and cites a couple of specimens.

36. **Grus mexicana** or **canadensis**. CRANE.—Inquiries about Camp 1 brought forth reports that a few years ago three cranes, "exceedingly good eating," were killed in the neighborhood, but our informants were not otherwise familiar with the species. Probably this refers either to the Sandhill or the Little Brown Crane which should migrate through this section. Horsbrough mentions seeing a crane of undetermined species May 4 at Alix.

37.* **Porzana carolina**. SORA RAIL.—Several Soras were seen in sloughs in the vicinity of Camp 1. Doubtless if we had worked adjoining ponds they would have been found throughout the country. Young took one near Camp 11 in a slough on the upper prairies near the Little Sandhill Creek.

38. **Fulica americana**. AMERICAN COOT.—Not seen by us, but Horsbrough records it as the commonest breeding bird on Buffalo Lake.

39. **Steganopus tricolor.** WILSON'S PHALAROPE.—Recorded near Innesfail by Wm. Geary, Oologist, XIV, 1897, p. 24, but not seen by us. A few were noted by Horsbrough at Alix, Buffalo Lake and Red Deer, and he found a nest at Alix.

40. **Recurvirostra americana.** AMERICAN AVOCET.—Horsbrough records a few breeding birds about Buffalo Lake.

41. **Gallinago delicata.** WILSON'S SNIPE.—Heard in their love flights, but not seen, as far down the river as Nevis. Young saw several and took specimens in the vicinity of Camp 11 on the Little Sandhill Creek, August 16. Horsbrough records nests at Buffalo Lake.

42. **Macrorhamphus griseus.** DOWITCHER.—Horsbrough records one taken at Buffalo Lake, August 22, referring it, probably incorrectly, to the western race, *M. g. scolopaceus*.

43. **Pisobia minutilla.** LEAST SANDPIPER.—July 8 at Camp 4 near Nevis six small waders were observed flying by but under circumstances that precluded specific identification. From the date they might as well have been late spring Semipalmated as early fall Least. Horsbrough records the latter as migrants at Buffalo Lake.

44. **Totanus melanoleucus.** GREATER YELLOW-LEGS.—Horsbrough records the species and says it frequently occurs with the Lesser Yellow-legs throughout the season at Alix and Buffalo Lake.

45. **Totanus flavipes.** LESSER YELLOW-LEGS.—Dippie thought they were breeding at Buffalo Lake in July 1896 and Horsbrough mentions them incidentally as occurring with the Greater in the same locality.

46. **Helodromas solitarius.** SOLITARY SANDPIPER.—A pair were seen on a small pool in an old ox-bow channel of the river near Nevis, Camp 4, July 6-9. Their strong reluctance to leave the immediate neighborhood and general actions were presumptive evidence of their breeding. I suspected the presence of young but could not verify it.

46.* **Catoptrophorus semipalmatus.** WILLET.—Just below Steveville and on the last few miles of our trip we saw three Willets on a mud bar in the middle of the river and collected two of them. They were both juveniles and could not be subspecifically determined. Dippie found young of Buffalo Lake, July 4, 1895, and Horsbrough records a nest there May 20, 1915.

47. **Bartramia longicauda.** UPLAND PLOVER.—Near Camp 1 a bird that we supposed to be of this species was seen and heard though not plainly enough to make certain identification. Mr. Brock, a local farmer, told us that two snipe-like birds bred in the vicinity besides the Spotted Sandpiper; a small one nesting in the swamps which we supposed to be Wilson's Snipe and a larger one on the uplands, laying a remarkably large egg. The latter is a quite suggestive description of this species. Horsbrough records a pair at Buffalo Lake.

49.* **Actitis macularia.** SPOTTED SANDPIPER.—Common all along the river and breeding everywhere. One bird on being flushed from her eggs flew into adjoining bushes and climbed about them in most unwaderlike style while complaining at our intrusion.

50. **Numenius americanus.** LONG-BILLED CURLEW.—Both Chas. and Geo. Sternberg who have had several seasons' experience on the Red Deer River have spoken of Curlews occurring in the late summer or early fall. July 22, when leaving, as I drove into Millicent I saw two or three Curlew flying in the distance. I refer them to this species on general probabilities. Horsbrough reports a sight record for the Hudsonian Curlew for Buffalo Lake, May 25, 1915, but does not mention the Long-bill. In western Alberta, the Hudsonian is most improbable.

51. **Charadrius dominicus.** GOLDEN PLOVER.—Horsbrough records two specimens sent him from Buffalo Lake, Oct. 11, 1916.

52.* **Oxyechus vociferus.** KILLDEER.—Not seen until August 23 at Camp 11, on the Little Sandhill Creek, where Young collected a single specimen from five seen. We have one downy young taken at Alix June 1915 by Horsbrough, who reports them common.

53. **Perdix perdix.** HUNGARIAN PARTRIDGE.—Horsbrough was informed that this species was introduced near Alix in 1909, but failed to survive to date (1914).

54.* **Bonasa umbellus.** RUFFED GROUSE.—Said to have been very common about Camp 1, a few years ago but now scarce. Though we found much excellent ground we met none in this neighborhood and only occasional ones elsewhere. The same agents that practically exterminated the Sharp-tails doubtless decimated this species. See that species for further discussion. At Camp 3 we saw and took one specimen; another was heard drumming at Camp 4 near Nevis. A brood of half grown young was met between Camps 5 and 6 and a single bird below Drumheller. Besides this specimen we have three birds from Ramsey and three from Morrin, taken by George Sternberg in 1915 and 1916. Of these but two birds are typical *umbelloides*, two cannot be distinguished from eastern *togata*, and the remainder are intermediate. *B. u. umbelloides* as it occurs on the Canadian prairies is a most unstable race and there is little satisfaction in attempting subspecific identification of individuals in these districts. The area of overlapping of the two races is very wide indeed. Horsbrough refers the local form to *togata* but has probably not compared specimens.

55. **Tympanuchus americanus.** PRAIRIE CHICKEN.—I have had the pleasure of examining a specimen of this species taken by Mr. Horsbrough in the vicinity of Red Deer Dec. 26, 1914, as he records. As it was unknown to local shooters it appears that this is the first specimen of the species for this locality and may be the forerunner of a permanent intrusion.

56.* **Pediceetes phasianellus.** SHARP-TAILED GROUSE.—This is the "prairie chicken," so called, of the Prairie Provinces, and as such is well known. They were said to have been exceedingly numerous on the Red Deer a few years ago but are very scarce now. Though we covered much ground where they were said to have been plentiful we saw none until late in July when Young collected four July 27 to September 13, in the neighborhood of the Little Sandhill Creek. We spoke to several residents

who were familiar with them and their tales tallied closely. First there were great numbers of the birds and then they disappeared suddenly and without apparent cause. Coincidentally numbers of "large gray hawks" and "big owls" appeared in the late fall and winter. Had the disappearance been principally due to overshooting, some birds would have been overlooked in the more out of the way localities; but, while the common report was that there had been little if any shooting on many parts of the river valley, the scarcity was general and we did not see a bird except as above. Correlated with the appearance of the raptores and the disappearance of the grouse of all kinds was the disappearance of the rabbits. It was the same story wherever we were in 1917: Shoal Lake, Manitoba; here on the Red Deer River; in British Columbia at Hazelton, and in Jasper Park, Alberta. In the last named place at least, overshooting cannot be blamed for the scarcity of grouse, as there is no shooting allowed there, and such small amount of poaching as might have taken place could not possibly have accounted for the almost total absence of birds. Also the widely scattered localities, practically all of central and western Canada, though perhaps less so in the mountains where heavy timber gives good cover, is suggestive of other causes than local shooting. I think it is evident that the occurrence of the well known rabbit disease that periodically decimates these rodents deprived the large raptores of their usual food and forced them to invade southern sections in unusual numbers and turn their attention to grouse. The Ruffed Grouse, living in the heavier timber where cover is better, suffered less than the more open country species. Without doubt when their usual food supply, the rabbit, is cut off, the large raptores constitute a serious destructive influence. It is an interesting study in the correlation of species and complicates the subject of game protection. All that seems possible to do under the circumstances is to encourage the killing of the large winter raptores, yet if this is carried too far the rabbit pests are likely to increase in normal years to a dangerous extent and in the present state of misinformation the ordinary farmer and shooter are likely to involve in destruction the useful species of *Buteo* and *Archibuteo*, birds that the prairie provinces cannot well spare. I will discuss them and their effects under the subject of Red-tail Hawk. Horsbrough refers his specimens to *campestris*, which is the geographical probability. The condition of plumage makes me unwilling to pronounce upon the subspecies.

57.* **Zenaidura macroura.** MOURNING DOVE.— Not very common. We heard of a pair breeding near Camp 1. One was heard the morning of July 10 at Ross's Ranch and another at Drumheller the 14th. One was noted the 18th above Steveville and one taken the next day between that village and Camp 11. Horsbrough records a single specimen from Buffalo Lake.

58.* **Cathartes aura.** TURKEY BUZZARD.— We saw the first Turkey Buzzards shortly after we entered the real Bad-lands above Camp 5, Ross's Ranch. From then on several or more were noted daily. At Camp 11

on the Little Sandhill we saw aggregations of a dozen to twenty a number of times. Specimens taken at this camp August 20 and September 4. Horsbrough does not mention the species about Alix or Red Deer.

59.* **Circus hudsonicus.** MARSH HAWK.—Occasional Marsh Hawks were seen from Camps 1 to 4 but were not common. About fifteen miles above Steveville a number of juveniles were seen, probably an original family not yet separated. After I left Camp 11 Mr. Young reports that Marsh Hawks became common. One day he saw a female carrying a Flicker for about a mile and a quarter when she dropped it to two young. On approaching and driving them away he found the Flicker still alive. Specimens taken August 6 and 10.

60.* **Accipiter velox.** SHARP-SHINNED HAWK.—Not very common as we descended the river, though Young says they were numerous after the middle of September at Camp 11, on the Little Sandhill Creek, where he observed them teasing Pigeon Hawks. We found a nest with five newly hatched young near Camp 1, June 25. It was in a spruce tree about twelve feet from the ground. These were taken, also several at Camp 11 on the Little Sandhill, August 27 to September 7. We also have an October specimen from Alix taken by Horsbrough, who also records nests at Red Deer.

61.* **Astur atricapillus.** AMERICAN GOSHAWK.—Between Camps 5 and 6, July 11, we saw a Goshawk cross the river ahead of us. Another was seen several times at Camp 8, near Rosedale Mines, and July 16 its nest containing three large downy young was found. It was about twenty feet up in a cottonwood in a slightly open spot in the bush. One was seen at Camp 11 on the Little Sandhill Creek, by Young, July 30. Besides the adult female and young above noted we have October and November specimens from Alix, taken by Horsbrough, and Mr. Edward Arnold informs me he has a set of eggs collected near Red Deer.

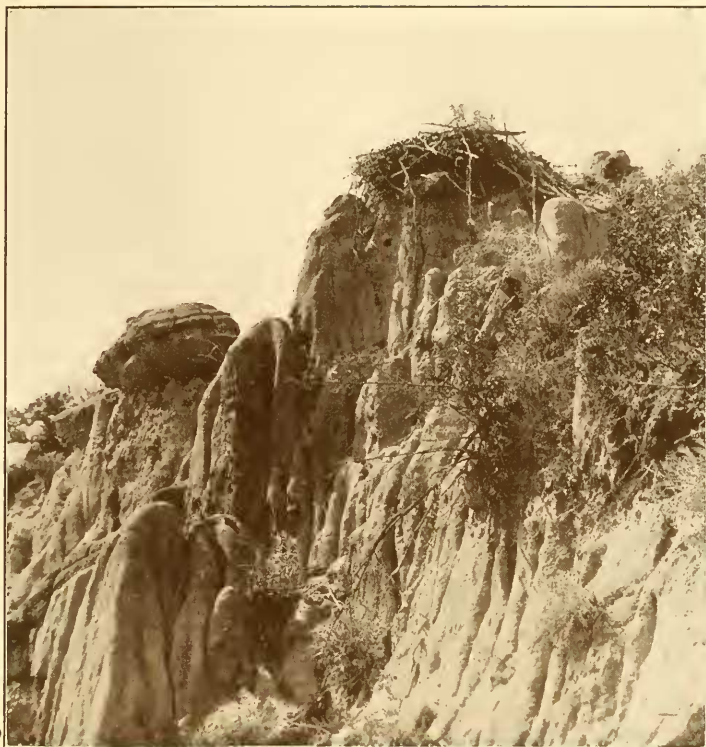
62.* **Buteo borealis.** RED-TAILED HAWK.—The most abundant Hawk on the river. It was seldom that one or more were not in sight and its nests dotted the larger trees every quarter of a mile or so to near Steveville. Near that village they grew fewer and finally disappeared and none were seen a few miles below at Camp 11 on the Little Sandhill Creek, in the midst of desert-like conditions. An accurate estimation of their numbers was very difficult owing to the presence of Swainson's Hawks from which it was usually most difficult to distinguish them except in most characteristic plumages. They were not excessively wary and a fine series of both adults and nestlings in various stages was obtained; the young usually with at least one parent taken and sometimes both. Of the birds seen there was a great variety of plumage and colorations, all the way from solidly dark to very light, faded specimens. The dark extremes were rather the least common and, either apparently or actually, more wary, for in spite of serious endeavor we were unable to obtain them. Several were shot, but falling off on a long slant they were lost in dense bush and could not be found. There is therefore still some doubt as to the

identity of many of these birds and many may have been Swainson's instead of Red-tails. In all twenty-two specimens were taken. Of these, except for a very faint to pronounced barring of the tail, there is no constant character to separate them from eastern *borealis*. They average slightly darker on the under-parts but at least two birds are lighter here than typical eastern birds while several are indistinguishable in this respect. Many of the tails are very light, but new incoming plumage of richer coloration indicates that this is due to the bleaching power of the bright prairie sun and is an acquired and not an inherent character. Fading however does not account for all the lightness, as in some cases the feathers are mottled or suffused with white from the shaft outward. While this culminates in a female taken July 9, the half grown offspring of the same bird has a dark tail similar to eastern juveniles, while all other juveniles having enough tail to judge from, show appreciable amounts of intermixed red such as is not seen in eastern birds.

I was in hopes that we would find *krideri* occupying this desert-like country but was disappointed, as we procured nothing that could not be attributed to *calurus*. One interesting point observed was that like usually mated with like, a light bird generally had a similarly colored mate and vice versa. Only in one case did we definitely discover a very dark bird paired with a light one. We obtained the three young of this pair and while they are hardly sufficiently fledged to accurately determine the characters they would finally exhibit, they show considerable difference in color. One tends towards an almost uniformly dark bird while the other two have plain indications of cream colored breasts and throats. It is evident therefore that the darkness of plumage is a congenital condition and not assumed with age; also that there is often a large amount of red in the tails of many juvenile birds such as is never (?) shown in eastern specimens of comparable age.

Naturally the abdomens of all the adults taken in the midst of the breeding season were bare; the skin was thickened and rugose, covered with dry, horny, scab-like plates that peeled off while skinning, and now that incubation was over, seemed ready to shed naturally before the incoming down of the midsummer moult. In addition to this, however, the throats were similarly affected. The throat feathers were ragged, worn and thin, whilst the skin between was excessively warty, the prominences tending to clear yellow in color and similar in appearance to the wattles of gallinaceous birds. It suggests that the throat is used in incubation as well as the abdomen.

The value of these large Buteos to the farmers of the prairie provinces is incalculable. This applies equally to Swainson's Hawk and the Ferruginous Roughleg. The country is infested with gophers, mostly Richardson's Spermophile in the section we visited, but Franklin's and the 13-lined were also present. Upon these the large hawks seem to feed almost entirely and their great number must be a powerful check upon them. However,



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1. NEST OF FERRUGINOUS ROUGH-LEG, BELOW NEVIS.
2. RED DEER RIVER NEAR NEVIS, ALBERTA.